How does the Sun and its magnetic field control the environment of the solar system? Exploration								
Exploration Contribution	Science Questions	2003	Investigations	Measurements	Region	Spacecraft Location	New Instruments	Technology Development
					Photosphere	Earth Earth	IRVM	Large arrays, deep well CCDs
Improve SEP Predictions			Understand the acceleration of energetic particles associated with flares, CMEs and shocks.	Magnetic fields and topology	Chromosphere	Earth	UVM	Prototype in development
		2b			TR-Corona Extended	Earth	IRVM LA/UVCS,	Large arrays, deep well CCDs
					Corona	Earth	LA/VLC	
				Image energetic particles and effects on solar atmosphere	Flare site,	Inner Heliosphere	GI	RHESSI large array sizes; small pixel
	How and where are high					Earth	XRIS	sizes: High count rates
						Earth	HXIS	large array sizes; small pixel sizes; hard x-ray focusing optics; High count rates
						Inner Heliosphere	NI. GR	RHESSI
	energy particles accelerated?			Energetic particles	Flare site.	Inner Heliosphere	Particle, Particle,	
				Plasma parameters	Current sheet,	Earth, inner heliosphere	LA/UVCS,	
				Etiti-l	CME Shock	II-lib	LA/VLC	
			Understand the acceleration of energetic particles and shocks throughout the heliosphere.	Energetic particles Plasma parameters Plasma distributions, compositions and charge state.	Heliosphere Heliosphere	Heliosphere Heliosphere	Particle Particle	
					II-lih	II-lih	Donatio Lo	
		2b			Heliosphere	Heliosphere	Particle	
				Flow field, mass flux	Heliosphere	Heliosphere	Particle	
				Magnetic fields and waves	Heliosphere	Heliosphere	Particle	
				Radio Emissions	Heliosphere	Heliosphere	Radio	
		1a	Understand the emergence of magnetic flux through the photosphere, Chromosphere, TR, and into the corona.	Vector magnetic field measurements.	Photosphere	Earth	IDVA.	I I II GGD
					Chromosphere	Earth Earth	IRVM UVM	Large arrays, deep well CCDs Prototype in development
					TR-Corona	Earth	IRVM	Large arrays, deep well CCDs
					Photosphere	Earth		5 5, 11p 111 5025
				Thermodynamic structure	Chromosphere	Earth	HTUVS	Gratings, active pixel sensors
					Transition	Earth Earth	HTUVS HRNBI	Gratings, active pixel sensors Image stabilization
					Region	Earth	HTEUVS	Gratings, active pixel sensors
					Corona	Earth Forth	HTEUVS	Gratings, active pixel sensors
	What are the physical processes the control the production of flares and CMEs, the primary source of solar energetic particles?			Velocity structure	Photosphere	Earth Earth	HRNBI	Image stabilization
					Chromosphere	Earth	HTUVS HTUVS.	Gratings, active pixel sensors
					Transition Region	Earth	HTEUVS,	Gratings, active pixel sensors
					Corona	Earth	HTEUVS	Gratings, active pixel sensors
			Understand the build up and release of magnetic energy in flares and CMEs Understand the generation of the 3-D solar wind.	Magnetic fields and topology	Corona	Earth, Ground	IRVM, UVM	Large array, deep well CCDs needed; prototype in development
				Thermodynamic structure	Chromosphere	Earth	HTUVS, HRNBI	Gratings, active pixel sensors;
					Transition	Eth	HTUVS,	Img stabilization Gratings, active pixel sensors;
					Region	Earth	HRNBI	Img stabilization
					C		HTEUVS, HRNBI,	Gratings, active pixel sensors;
					Corona, Current Sheet,	Earth	XRIS,	Img stabilization; large array
					CME Shock	Latur	XHRIS, LA/UVCS,	sizes; small pixel size; X-ray Optics
							LA/VLC	Optics
				Velocity structure	Chromosphere Transition		HTUVS	Gratings, active pixel sensors
					Region	Earth	HTUVS	Gratings, active pixel sensors
					Corona,		HTEUVS, XHRIS,	Gratings, active pixel sensors;
					Current Sheet, CME Shock	Earth	LA/UVCS,	ray optics and detectors
					CIVIE SHOCK		LA/VLC	
				Photospheric magnetic field motions.	Photosphere	Earth, Ground	VDIC LIVIC	
				Energy release	Corona, Current Sheet,	Forth inner halicenham	XRIS, HXIS, GI, XHRIS,	large array sizes; small pixel
					CME Shock	Earth, inner heliosphere	LA/UVCS,	sizes; High count rates; hard x- ray focusing optics;
		1b		Energetic particles	Corona	Inner Heliosphere	LA/VLC NI. Particles	RHESSI
				Magnetic fields and	Photosphere	Earth, Ground, Polar	UVM. IRVM	Large arrays, deep well CCDs
				topology	Chromosphere TR-Corona	Earth, Polar Earth, Polar	UVM, IRVM	Large arrays, deep well CCDs Large arrays, deep well CCDs
					Chromosphere	Earth, Polar	HTUVS,	Gratings, active pixel sensors;
							HRNBI HTUVS,	Img stabilization
				DI	Transition Region	Earth, Polar	HTEUVS.	Gratings, active pixel sensors; Img stabilization
				Plasma parameters			HRNBI HTUVS,	
					Coronal base to 10 R_sun	Earth, Polar	HRNBI, LA/UVCS, LA/VLC	Gratings, active pixel sensors; Img stabilization
				Plasma distributions, compositions and charge state.	Coronal base to		HTUVS,	
	How are high energy particles transported through the heliosphere?					Earth, Polar	HTEUVS,	Gratings, active pixel sensors
					10 R_sun		LA/UVCS, LA/VLC HTUVS,	
				Flow field, mass flux	Coronal base to		HTUVS,	
					10 R sun	Earth, Polar	HTEUVS, LA/UVCS,	Gratings, active pixel sensors
					-		LA/VLC	
		1c	Understand the propagation of the 3-D solar wind.	Vector magnetic field measurements.	Heliosphere	0.3-5AU in and out of ecliptic		
				Plasma distributions,				
				compositions and charge state.	Heliosphere	0.3-5AU in and out of ecliptic		
				Plasma Waves/Radio	Heliosphere	0.3-5AU in and out of ecliptic		
				Solar wind EUV	In situ		DELIC	low intrinsic noise MCPs;
				emission	Boundary Region	1-4AU, in and out of ecliptic	DEUS	diffraction gratings
				Flow field, mass flux	Heliosphere	0.3-5AU in and out of ecliptic		
	How does the solar wind/magnetosphere interaction accelerate high energy particles?	3b	Understand the propagation of energetic particles and shocks throughout the heliosphere.	Energetic particles	Heliosphere	0.3-5AU in and out of ecliptic	-	
				Plasma parameters Plasma distributions,	Heliosphere	0.3-5AU in and out of ecliptic		
				compositions and	Heliosphere	0.3-5AU in and out of ecliptic		
				charge state. Flow field, mass flux	Heliosphere	0.3-5AU in and out of ecliptic	-	
				Magnetic fields and				
				waves	Heliosphere	0.3-5AU in and out of ecliptic	1	ĺ